

# Traumatic Cyclodialysis Cleft Surgical Management Using Encirclage and Cryotherapy : A Novel Approach

Gitanjali Sood<sup>1,2</sup>, Vinata Rajendran<sup>1</sup>, Tarun Sharma<sup>1</sup> & Rajiv Raman<sup>1</sup>

<sup>1</sup> Shri Bhagawan Mahavir Vitreo Retinal services; Sankara Nethralaya, Chennai, Tamil Nadu, India

<sup>2</sup> All India Institute of Medical Sciences, Rishikesh, Uttarakhand, India

Correspondence: Gitanjali Sood, Shri Bhagawan Mahavir Vitreo Retinal services; Sankara Nethralaya, Chennai, Tamil Nadu, India. E-mail: [gitz.sood@gmail.com](mailto:gitz.sood@gmail.com)

Received: December 24, 2019; Accepted: February 12, 2020; Published: March 2, 2020

## Abstract

This is a retrospective case series of 4 patients with traumatic cyclodialysis cleft (CC) with features of hypotony and posterior segment manifestations of blunt trauma who were treated using encirclage and trans scleral cryotherapy along with vitrectomy. Encirclage was placed anteriorly in order to support the cleft. There was closure of cleft and improvement in Intra ocular pressure (IOP) in all cases. Thus the identification and treatment of CC with encirclage in cases with varied posterior manifestation of trauma can lead to good anatomical and visual restoration.

**Keywords:** trauma eye, cyclodialysis cleft, encirclage, vitrectomy

## 1. Introduction

Blunt trauma can have varied manifestations amongst which CC is there, a cleft forms once the ciliary body separates from sclera and thus the aqueous can freely pass from anterior chamber to suprachoroidal space. This leads to hypotony in eye and its sequel. Various treatment options tried in management of CC so far are mydriatics, (Ormerod, Baerveldt, Sunalp & Riekhof, 2006) ciliochoroidal diathermy, (Mauger & Stark, 1971) cyclohexane, (Kuchle & Naumann, 1995) placement of anterior scleral buckle at site of cleft, (McCannel, 1976) cryoablation to cleft to induce scarring and closure, (Mandava, Kahook, Mackenzie & Olson, 2006) argon laser photocoagulation which also leads to scar formation, (Harbin, 1982) combined vitrectomy with cryotherapy and gas tamponade, (Hoerauf, Roeder & Laqua, 1999) trans-scleral YAG or diode laser, (Amini & Razeghinejad, 2005) microendoscope assisted endophotocoagulation. (Saha, MacNaught & Gale, 2003)

This is for the first time in literature that encirclage was used as treatment option for CC and we describe our experience for 4 eyes.

**CASE NO 1:** A 30 year old male was referred for management of hypotony in left eye; subsequent to cracker injury 147 days back. Argon laser to CC was done twice. His vision in left eye was 20/60 with unrecordable low IOP. On examination anterior chamber was shallow, retinal features were disc edema, dilated tortuous blood vessels, and retinal folds with resolving vitreous haemorrhage. Gonioscopy revealed CC from 9-11 and 4-7 o'clock. Repeat argon laser was done to both sites (260 spots, 50  $\mu$ m, 0.1 second, and 770mW). IOP on second day was 2 mmHg; patient was followed up for 2 months with persistent cleft and low IOP. His visual acuity deteriorated due to cataract and macular pucker. Thus patient underwent lensectomy + vitrectomy+ fluid gas exchange + endocryotherapy to cleft with belt buckle. The important thing in the surgical procedure was that buckle was placed quite anteriorly just at muscle insertion and endocryotherapy was done posterior to ciliary processes from 9-12 o'clock and 4-7 o'clock. Following tightening of buckle the disc was seen to lose its edema. At 6 weeks the BCVA was 6/5 with aphakic correction, IOP was 16 mm Hg and gonioscopy showed cleft closure. Visual field in left eye: 34e isopter depression disappeared.

**CASE NO 2:** A 15 year old boy sustained trauma to left eye with cycle chain 175days back followed by diminution of vision. At presentation his BCVA was hand movement. Examination revealed iridodialysis in one quadrant with subluxated lens (less than 180 degree) and vitreous in anterior chamber and traumatic mydriasis. The recorded IOP was 0 mm Hg and on gonioscopy there was a cleft of 3 clock hours in inferotemporal quadrant. There was associated macular scar and total retinal detachment. Thus the patient underwent left eye surgery with iridodialysis repair, lensectomy, vitrectomy, encirclage, endolaser and silicone oil infusion (1300Cst). After 6 weeks his BCVA

in left eye was 2/60 due to macular scar and IOP raised to 10 mm Hg. After 5 months patient underwent silicone oil removal and was advised for a regular follow up.

**CASE NO 3:** A 34 year old male presented 10 days after sustaining blunt trauma with a paint compressor with sudden painless diminution of vision. His BCVA was counting fingers at 2 m associated with traumatic mydriasis, iridodialysis in 1 quadrant, phacodonesis and vitreous hemorrhage. The eye pressure was 4 mm Hg and on gonioscopy there was a cyclodialysis cleft in 6 clock hour’s nasal quadrant (Figure 1a). Patient was initially prescribed topical and systemic steroids and 1% atropine eye drop At 2 weeks IOP was 24 mm Hg and there was posterior closure of cleft, steroids were tapered. He presented after 2 months with sudden decrease in vision and total retinal detachment. Thus lensectomy, vitrectomy, encircilage, fluid gas exchange, endolaser and silicone oil infusion (1300Cst) was done. Post operatively he maintained a vision of 20/400 and IOP was always recorded in the range of 12-16 mm Hg with cleft closure seen on gonioscopy. UBM confirmed the closure with indentation effect due to encircilage also seen in the area of ciliary body (Figure 1b).

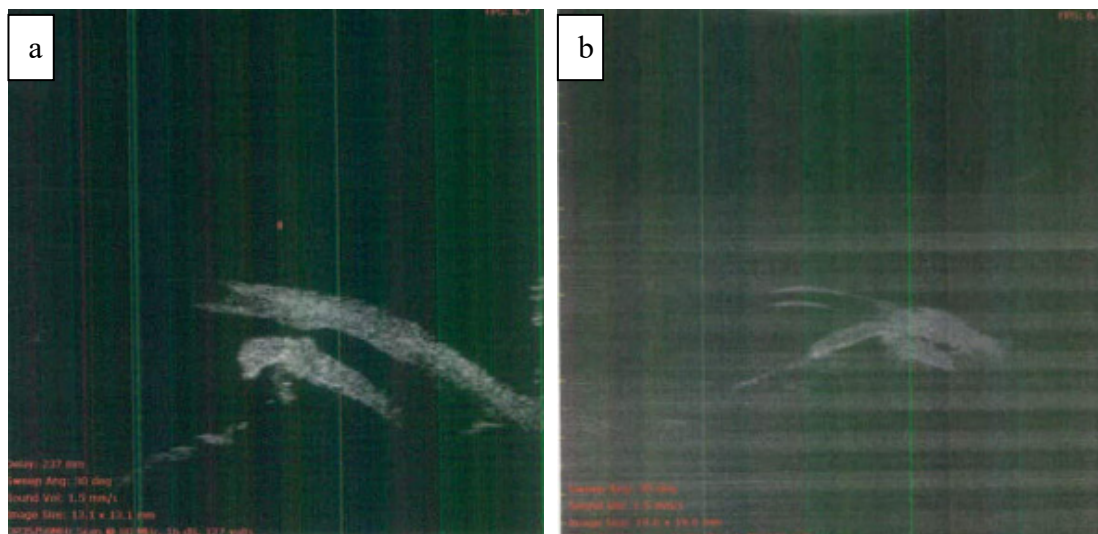
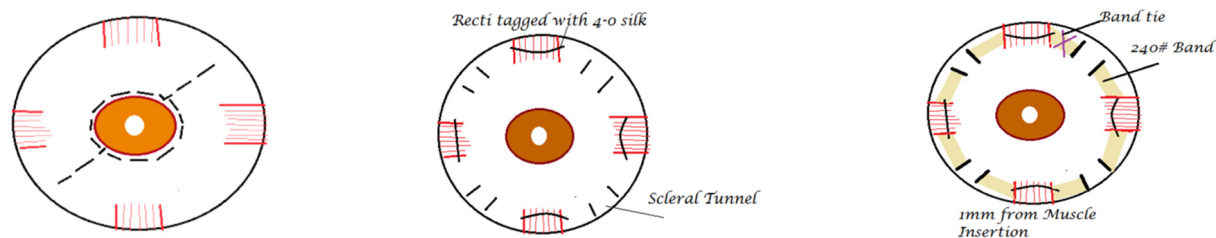


Figure 1. UBM picture showing a) preoperative presence of cleft. b) Postoperative picture showing the closure of cleft with some indentation of ocular coats overlying it

**CASE NO 4:** One month after trauma with tennis ball in left eye a 65 year old male patient came with the complaints of blurred vision. There was traumatic subluxated cataract with phacodonesis. A very shallow anterior chamber, BCVA of 20/120 and IOP 10 mm Hg. UBM revealed loss of zonules in more than two quadrants. A suspicion of cleft was there as the IOP was normal despite total angle closure and thus laser iridectomy was done. After which an area of cleft in superior quadrant was noted. Thus patient underwent lensectomy, vitrectomy and scleral fixated lens and trans scleral cry to cleft site. Intraoperative an area of dialysis was seen thus additional encircilage with endolaser and C3F8 gas tamponade was used and IOL was not implanted. Post operatively the patient had high IOP which was controlled on topical medications and stopped after 6 weeks. BCVA was 20/30 with contact lens, IOP maintained in normal range without any medication and cleft closed.

**2. Discussion**

In our article we have described a newer technique of managing persistent cyclodialysis cleft using encircilage with trans scleral cryotherapy. The procedure is similar to the routine encircilage except that the site is anterior just at the muscle insertion(Figure1). Trans scleral cryotherapy is applied to the site of cleft.



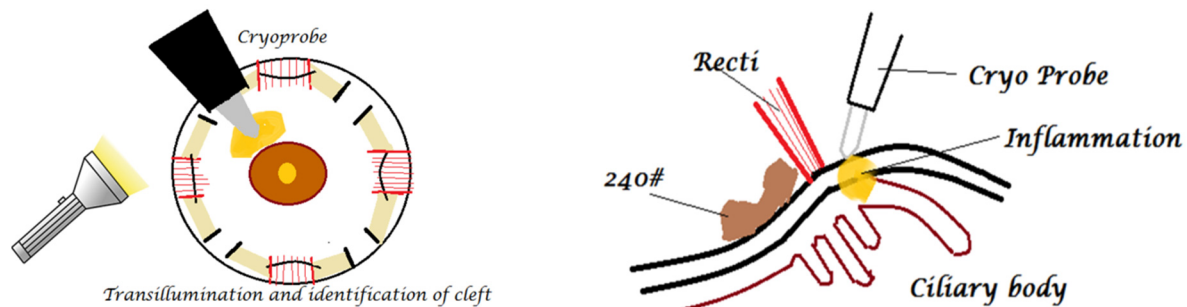


Figure 2. Surgical steps in encirclage for cyclodialysis

A) 360 degree conjunctival peritomy with two oblique radial relaxing incisions. B) All recti muscles were bridled with 4-0 silk suture and partial thickness scleral tunnels made in 4 quadrants at muscle insertion. C) Encirclage passed through the tunnels. D) Trans scleral cryotherapy done to cleft size with identification using transillumination. E) Mechanism of cleft closure: encirclage reverses the direction of forces from radially inward force to an outward force, thereby promoting cleft reattachment and trans scleral cryotherapy at that site will form a scar at that area for permanent adhesion.

We also compared in similar paper the functional and structural success of this technique with the conventional argon laser and found that both are comparable. Though this technique has the advantage of one time procedure in patients with different manifestations of blunt trauma and in failure cases of argon laser.

## References

- Ormerod, L. D., Baerveldt, G., Sunalp, M. A., & Riekhof, F. T. (1991). Management of the hypotonous cyclodialysis cleft. *Ophthalmology*, *98*, 1384-1393. [https://doi.org/10.1016/s0161-6420\(91\)32121-3](https://doi.org/10.1016/s0161-6420(91)32121-3)
- Maumenee, A. E., & Stark, W. J. (1971). Management of persistent hypotony after planned or inadvertent cyclodialysis. *Am J Ophthalmol*, *71*, 320-332. [https://doi.org/10.1016/0002-9394\(71\)90405-3](https://doi.org/10.1016/0002-9394(71)90405-3)
- Kuchle, M., & Naumann, G. (1995). Direct cyclopexy for traumatic cyclodialysis with persisting hypotony: Report in 29 consecutive patients. *Ophthalmology*, *102*, 322-333. [https://doi.org/10.1016/s0161-6420\(95\)31021-4](https://doi.org/10.1016/s0161-6420(95)31021-4)
- McCannel, M. A. (1976). A retrievable suture idea for anterior uvea problems. *Ophthalmic Surg*, *7*, 98-103.
- Mandava, N., Kahook, M., Mackenzie, D., & Olson, J. L. (2006). Anterior scleral buckling procedure for cyclodialysis cleft with chronic hypotony. *Ophthalmic Surgery, Lasers & Imaging*, *37*, 151-153.
- Harbin, T. (1982). Treatment of cyclodialysis clefts with argon laser photocoagulation. *Ophthalmology*, *89*, 1082-1083. [https://doi.org/10.1016/s0161-6420\(82\)34689-8](https://doi.org/10.1016/s0161-6420(82)34689-8)
- Hoerauf, H., Roider, J., & Laqua, H. (1999). Treatment of traumatic cyclodialysis with vitrectomy, cryotherapy, and gas endotamponade. *Journal of Cataract and Refractive Surgery*, *25*, 1299-1301. [https://doi.org/10.1016/s0886-3350\(99\)00160-1](https://doi.org/10.1016/s0886-3350(99)00160-1)
- Amini, H., & Razeghinejad, M. (2005). Transscleral diode laser therapy for cyclodialysis cleft induced hypotony. *Clinical and Experimental Ophthalmology*, *33*, 348-350. <https://doi.org/10.1111/j.1442-9071.2005.01008.x>
- Saha, N., MacNaught, A. I., & Gale, R. P. (2003). Closure of cyclodialysis cleft using diode laser. *Eye*, *17*, 527. <https://doi.org/10.1038/sj.eye.6700407>
- Sood, G., Rajendran, V., George, R., Sharma, T., & Raman, R. (2019). Comparison of encirclage and cryotherapy with argon laser in the management of traumatic cyclodialysis cleft. *Int J Ophthalmol*, *12*(1), 165-168. Published 2019 Jan 18. <https://doi.org/10.18240/ijo.2019.01.24>

## Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).